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No. XIV.

MICROSCOPE FOR MINUTE DISSECTION.

The SILVER MEDAL *was presented to Mr. H.* GOADBY, *76 Goswell Street, for his Microscope and Instruments adapted to the minute Dissection of Insects, &c.*

THE following communication has been received from Mr. Goadby on the subject:—

The first thing necessary in preparing an insect for dissection is to dry its surface perfectly; for if it possess any external moisture it will not adhere firmly to the wax, and, after the operator has toiled for some hours, he will find the insect suddenly floating on the surface of the water in which he was dissecting it, and his time and labour lost. This caution applies more particularly to insects which have been preserved in spirits of wine, and also to those which have been killed by immersion in water, either hot or cold. The wax which I have found best is prepared as follows:—Half of pound of white wax, two ounces of flake-white, three ounces of Venice turpentine, one ounce of hog's lard, simmered together in a clean earthen pipkin, and cast in cakes for use. One of these should be put into the tin pan *g g*, fig. 8, Plate III. and melted by the application of a gentle heat; the insect must then be placed in the wax, and in such position as may best suit the purpose of the anatomist. If he desire merely to obtain a general view of the organic structure, it is better to lay the creature on its back, when, on removing the integuments and investing membrane, he will see the great nervous cord with its ganglia, the alimentary canal with the extensive ramifications of the liver, the distribution of the respiratory organs, muscles, &c. &c.

Either of these structures may be dissected from its connexions with the utmost ease and should be preserved in balsam of Canada, between two plates of glass, or talc and glass, which will not only permanently preserve it, but render it at all times available for the purposes of microscopical research. When the dissection is completed, the *shell* only will remain, and, if properly managed, will be found in intimate contact with the wax, which will present a mould, beautifully sharp, of the insect.

In dissecting some insects (particularly larvæ of the *Lepidoptera*), the operator will be continually annoyed by the great quantity of fat and oil floating on the surface of the water, of such a depth that the object will be completely obscured by it; he must then remove the pan from the microscope, and pour in clean water till all the thick scum of fat be washed away: it is sometimes necessary to repeat this several times in the course of one sitting.

When the dissection is likely to be tedious, proof spirit should be used in place of water, to prevent decomposition.

This microscope, from the simplicity of its construction, the support it affords to the hands of the operator, and the facility of all its arrangements, may be employed most advantageously by the comparative anatomist, or in making out the minute anatomy of the human subject; and for dissections of those important organs, the eye and internal ear, it is peculiarly well adapted.

I am, Sir, &c. &c.

A. Aikin, Esq. H. Goadby.
Secretary, &c. &c.

The general form of Mr. Goadby's microscope is very like Mr. Slack's, described in Vol. XLIX.; therefore, a section of its top will be sufficient : —

a a, fig. 8, the top of the wooden case; this forms the stage : *b* the stem raised or lowered for adjustment by the pinion-head *c*: *d* the arm which carries the lens; it is shewn holding a coddington lens (*i. e.* a globular lens, having its sides ground away like an hour-glass, to obtain a central aperture): *e* the aperture of the stage; in it is fitted the circular ring *f* of a square tin trough *g g*, the bottom of which is covered with wax. In this trough is represented a cockroach, stuck down in the wax whilst liquid, and its limbs placed orderly right and left; water is then poured into the trough till it more than covers the object, and nearly fills the trough. A condensing lens *h* is placed before the light, low enough to clear the head of the operator, and to direct the condensed light to the surface of the water; and here is an incidental advantage, from the refractive power of the water, which directs this very oblique light downwards towards the object just as though it came from the dotted lines *i i*, a place occupied by the head of the operator. The object is now well seen through the lens, which, by its rack-arm, can be moved to and fro along it, and, by the central pin, right and left over every part.

The object being now ready for dissection, the remaining figures shew the tools which Mr. Goadby has found most eligible; they are all drawn the real size except the scissors, which are only half the real size. Figs. 9, 10, and 11, being such as oculists use, are called eye-knives; the blades of the small ones are as thin as can possibly be made, and are thoroughly polished. Fig. 12 are two views of the same needle-point; it is made as thin and sharp as possible: there are likewise two curved points, like fig. 13. All these have octagonal ivory handles four inches long. There are two pairs of steel forceps, both extremely sharp pointed, and very stiff (one pair is straight, the other curved like fig. 14), and are made thin enough to spring between *j j*, and then rough to *k*, from whence they gradually taper to a sharp point: the scissors, fig. 15, are also curved, and end in as sharp points as possible. All the instruments are finished under a microscope; and those used by Mr. Goadby were made by Mr. T. Weedon, of Hart Street, Bloomsbury, surgeon's-instrument maker.

The object being operated on in water, parts loosened by these tools will readily float away to a safe place, and there may be taken by the forceps if needful.